

REMARKS

Claims 1-9 are pending in this application with Claim 1 being amended by this response.

Claim 1 has been formally amended to correct a typographical error by replacing the word "same" with the word "single" for purposes of clarity. Support for this amendment can be found in the original claim 1 submitted with this application and further can be found throughout the specification, specifically on page 1, line 29. It is respectfully submitted that no new matter has been added and no new issues have been raised by this amendment.

Rejection of claims 1, 7 and 8 under 35 U.S.C. 103(a)

Claims 1, 7 and 8 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (U.S. 6,573,945) in view of Mihara (U.S. 6,229,849) for the reasons stated in the Office Action.

The present claimed invention recites a process and device for the MPEG type video coding of high definition images wherein the image is split into panels and an encoder is assigned to each panel. Two or more panels constitute, over the length of the image, a horizontal band of the image. A rate control is implemented at a band level as a function of a preset bit rate for the band. Each encoder of the band takes into account a single Video Buffering Verifier (VBV) calculated for the whole band.

The present claimed invention is directed to implementing the rate control algorithm of each coder at a band level by using a same virtual buffer. This global VBV buffer takes into account global data, i.e. data concerning the whole band. The coding of the panels which make up a band is made at a band level and not at a panel level. Therefore, instead of having constraints specific to each coder, one single constraint exists for the entire band. This single constraint relates to the single Video Buffer Verifier. This constraint for the band is consecutively reduced as it is no longer an aggregation of constraints from each coder dedicated to the band (overflow can be compensated by underflow) thereby allowing improvement of the coding image quality.

Wu et al. disclose an image split (110) into panels and a processing of each panel (122) through video compressors as can be seen in Figure 1 thereof. The Master controller controls the flow of data and coordinates and synchronizes the video compressors. The Examiner states that Wu et al. fail to disclose the VBV of the present claimed invention.

Mihara discloses the use and management of a VBV buffer and statistical multiplexing of data streams coming from the programs P1, P2...Pn. This method of management allows for maintenance of a short delay when the output bit rate changes. The problem solved by Mihara relates to a live broadcast in which the delay time has to be minimized.

According to the Examiner, it would have been obvious to modify the system of Wu as taught by Mihara to minimize the delay time. However, Applicant respectfully disagrees with the Examiner's statement as the problem solved by our invention is not to minimize a "delay time". Rather, the purpose of the present claimed invention is the implementation of a rate control algorithm of each coder at a band level by using a single virtual buffer. Therefore, it is respectfully submitted that one skilled in the art would not modify the system of Wu et al. with the system taught by Mihara to accomplish the object of the present claimed invention.

Moreover, Wu et al. relates to compressors corresponding to panels whereas Mihara relates to coders corresponding to programs, it is respectfully submitted that there is not suggestion or motivation for one skilled in the art to combine these documents. The data in Mihara that is being multiplexed is program data, and the data in both the present claimed invention and Wu that is multiplexed is panel data. Thus, as the data being multiplexed in each of the prior art devices is different, the problem solved by each device is different as well. Specifically the present claimed invention differs from both Wu and Mihara in that the present claimed invention calculates a VBV for the whole band, meaning the control is made at a band level and not a panel or program level.

Furthermore, it is respectfully submitted that it is not obvious to combine the system of Wu et al. with the system of Mihara based on the multiplexing performed in Mihara. Specifically, statistical multiplexing disclosed in Mihara manages the output rate of each encoder to get a constant or predetermined global output rate whereas VBV

management manages the output rate of an encoder to avoid overflow or underflow in the corresponding buffer on the decoder side. As explained in column 11, lines 13 to 60 of Mihara, the controller 24 calculates the usable range of the VBV and the occupancy quantity. The capacity of the VBV buffer is 1.8 Mbits (see Mihara column 20, line 63) and the described VBV for statistical multiplexing corresponds to the buffer of the decoder (See Mihara column 22 lines 32-35). Thus, the problem of overflow/underflow in the buffer of the decoder relates only to the program selected on the decoder side. Mihara neither discloses nor suggests “a rate control [is] implemented at a band level” as in the present claimed invention. Mihara also neither discloses nor suggests “each encoder of the band taking into account a single Video Buffering Verifier (VBV) calculated for the whole band” as in the present claimed invention.

Applicants respectfully disagree with the Examiner’s assertion that Mihara discloses the VBV as in the present claimed invention. Specifically, the abstract only teaches the management of a VBV when a bit rate change occurs and Fig.4, which was also cited by the Examiner, shows an image multiplexing system. As explained in column 8 of Mihara, the controller 3 determines the target bit rate with respect to each program P_i , by using a statistical multiplexing technique. This technique allocates the global bit rate to each program according to a complex calculation. This well-known technique of rate allocation is not based on the management of a single VBV for all the programs. According to the Examiner, Mihara discloses the present claimed invention in figure 6. It is respectfully submitted that this figure only explains the management of a VBV buffer for a given program. As discussed above, Mihara neither discloses nor suggests “a single Video Buffering Verifier (VBV) calculated for the whole band” as in the present claimed invention.

In fact, unlike the present claimed invention there is no common VBV for the system layer. The video stream at the output of the coder is packetized to give a packetized elementary stream (PES) and these PES are multiplexed to give the transport stream (system layer). A specific VBV buffer is calculated for each video stream, according to their bit rate. This bit rate, which is part of the global bit rate, is consequently allocated to each program through a global management.

In view of the above remarks, it is respectfully submitted that claims 1 and 7 are patentable over of Wu et al. when taken alone or in combination with Mihara. Additionally, it is respectfully submitted that as claim 8 is dependent on claim 7, claim 8 is also patentable for the same reasons as discussed above regarding claim 7. It is thus further respectfully submitted that this rejection is satisfied and should be withdrawn.

Rejection of claims 2-5 and 9 under 35 U.S.C. 103(a)

Claims 2-5 and 9 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (U.S. 6,573,945) in view of Mihara (U.S. 6,229,849) as applied to claims 1 and 8 above and further in view of Blawat et al. (U.S. 6,198,878).

As discussed above, Wu et al. and Mihara neither disclose nor suggest “a single Video Buffering Verifier (VBV) calculated for the whole band” as in the present claimed invention.

Blawat et al. disclose the use of a VBV buffer for controlling the output bit rate. The process of Blawat et al. deals with the use of only one coder and, consequently, Blawat et al. neither disclose nor suggest a global rate control as in the present claimed invention.

As the coding of the image of the present claimed invention is of the MPEG type, if several coders are used to code different parts of the image, each coder would operate separately through a feedback loop acting on the quantization step to control its output rate.

If the buffer size of the decoder is, for example, 8 MB and if there are three panels constituting a band and the image, it is respectfully submitted that one skilled in the art would choose a separate coder for each panel, a separate rate control for each panel, a separate VBV buffer for each coder and a separate control algorithm for each VBV, giving each of the three virtual buffers a size of 8/3 MB. The main idea of the present claimed invention is the implementation of the rate control algorithm of each coder at a band level by using a single virtual buffering verifier (VBV) calculated for the whole band. This global VBV buffer takes into account global data, i.e. data concerning the whole band. Such is neither disclosed nor suggested by Blawat et al.

Instead of having constraints specific to each coder, an only constraint of the present claimed invention exists for the whole band, the one relating to the single Video Buffer Verifier. The constraint for the band is consecutively reduced as it is no longer an addition of constraints of each coder dedicated to the band (overflow can be compensated by underflow...) allowing improvement of the coding image quality.

The problem concerning the use of several VBV's is not raised in Blawat et al. In conclusion, none of the cited documents, taken separately or combined, discloses or suggests the present invention as claimed.

In view of the above remarks and the remarks regarding claims 1 and 7, it is respectfully submitted that claims 2-5 and 9 are patentable over of Wu et al. and Mihara when taken alone or in any combination with Blawat et al. Thus, it is further respectfully submitted that this rejection has been satisfied and should be withdrawn.

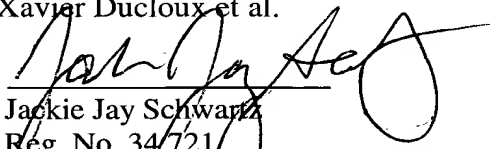
In view of the above remarks, it is respectfully submitted that claims 1-9 are in condition for allowance. Accordingly then, reconsideration and allowance are respectfully solicited. If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the applicant's attorney at the phone number below, so that a mutually convenient date and time for a telephonic interview may be scheduled.

No fee is believed due with this response. However, if a fee is due, please charge the additional fee to Deposit Account 07-0832.

Thomson Licensing Inc.
Patent Operations
P.O. Box 5312
Princeton, NJ 08543-5312
February 3, 2004

Respectfully submitted,
Xavier Ducloux et al.

By


Jackie Jay Schwartz
Reg. No. 34,721
Telephone No.: (609) 734-6866

CERTIFICATE OF MAILING

I hereby certify that this amendment is being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to the Mail Stop: AF, Commissioner for Patents, Box 1450, Alexandria, Virginia 22313-1450 on:

FEB. 3, 2004

Date


Patricia M. Fedorowycz